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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/089,985	04/03/2002	Sakari Laitinen-Vellonen	11001.094	3221
7590 11/08/2005			EXAMINER	
Christopher J Fildes			OLSEN, KAJ K	
Fildes & Outland			ART UNIT	
Suite 2			PAPER NUMBER	
20916 Mack Avenue			1753	
Grosse Pointe Woods, MI 48236			DATE MAILED: 11/08/2005	

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/089,985		LAITINEN-VELLONEN, SAKARI	
	<b>Examiner</b>		<b>Art Unit</b>	
	Kaj K. Olsen		1753	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 August 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 14-26 is/are pending in the application.
- 4a) Of the above claim(s) 14-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 18,20,21 and 24 is/are rejected.
- 7) ☒ Claim(s) 19,22,23,25 and 26 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                        |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                            | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## DETAILED ACTION

### *Election/Restrictions*

1. Claims 14-17 remain withdrawn from further consideration as being drawn to a non-elected invention.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 18, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glass et al (USP 5,120,421) in view of Liu (USP 4,655,880) and Cummings et al (USP 3,676,321). Cummings is being cited and relied on for the first time with this office action.
4. Glass discloses an electrochemical sensor for analyzing a liquid that comprises at least five series of working electrodes 200 and counter electrodes 206. See fig. 12 and col. 9, ll. 40-65. With respect to each series comprising a reference electrode as well, Glass discloses earlier that the counter electrode can be utilized alone or in conjunction with a reference electrode. See col. 8, line 38-41. Hence Glass recognized that both two and three electrode configurations are known in the art. Although Glass never explicitly stated that discussion at col. 8 could be utilized for the embodiment described in col. 9, one possessing ordinary skill in the art would have recognized based on Glass's discussion that a three electrode configuration of the fig. 12 embodiment would have required only routine skill in the art. With respect to the claimed

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common bias electrode, any of the additional reference or counter electrodes 206 not counted as part of the various series would have read on this additional electrode. With respect to the electrode being for the establishment of a common-bias, there is no claimed structure explicitly drawn to the use of this electrode as being for establishing a common bias. Hence the use of the electrode as a common bias electrode constitutes the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability. Glass discloses the use of a potentiostat for analyzing the electrode response, but does not explicitly identify the use of a pre amplifier to amplify these various electrode signals. Liu teaches in an alternate sensor that potentiostat circuits comprise the amplification of the working electrode signals. See fig. 1 and col. 6, ll. 24-37. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to amplify the electrode signals such that their current responses can be more readily monitored. With respect to the amplifier being a “pre-amplifier”, the examiner is not aware of any fundamental distinction between an amplifier and a pre-amplifier and the amplifier of Liu would read on the claimed pre-amplifier of the instant invention.

5. With respect to the new limitation requiring the electrodes be “mechanically discrete”, this is an inherent property of any electrode series including that of Glass. For example, fig. 12 shows a total of 19 electrodes all of which are mechanically discrete. These 19 electrodes shown in the figure would meet the claimed requirement for at least 13 electrodes (i.e. 4 series of 3 electrodes with an addition common electrode) and all these electrodes are mechanically discrete. With respect to the new limitation requiring “each electrode being in a channel”, Glass does not explicitly disclose doing this. Glass is drawn to the monitoring of the environmental

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conditions of water systems (col. 1, ll. 27-44). Cummings discloses that electrode systems for the environmental monitoring of water are conventionally placed in channels 18 so as to conveniently deliver desired sample to the electrode system in a manner that minimizes sample turbulence. See fig. 1 and 2 and col. 4, ll. 17-46. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Cummings and place the array of Glass in a sample channel so as to allow sample to be conveniently delivered to the array of Glass and to reduce the sample turbulence. If the array of Glass were placed in a sample channel as argued above, it would meet this new limitation requiring each electrode to be in a channel.

6. With respect to the electrode materials, see Glass, col. 8, ll. 54-63.

7. With respect to the pre-amplifiers being in the immediate vicinity to the electrodes, absent an explicit definition of what constitutes an immediate vicinity, the location shown by Liu would meet this limitation. Alternatively, it is well known that the longer one delays amplifying a small measurement signal, the more corrupted the measurement signal can get. Hence one possessing ordinary skill in the art would have been motivated to move the amplifier of Liu to the immediate vicinity of the electrodes to prevent undesirable signal degradation. In addition, see the alternative rejection below.

8. Claims 18, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winqvist et al (Meas. Sci. Technol., 9, pp. 1937-1946, 1998) in view of Liu and Teske (USP 5,503,720). Teske is being cited and relied on for the first time with this office action.

9. Winqvist discloses an electrochemical sensor comprising at least six working electrodes as well as a counter and reference electrode. See fig. 1 and section 3.2. Claim 18 differs from

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the teaching of Winkist by setting forth that each cell comprises a counter and reference electrode. However, it is well known in the art that a plurality of working electrodes can be provided with a single reference and counter electrode for all the working electrodes or each be provided with its own reference and counter electrode. This is demonstrated by the teaching of Liu where there are embodiments that utilize only a single reference and counter electrode for all the working electrodes (fig. 6) like Winkist, or utilize a counter and reference electrode for each working electrode (fig. 1 and 5). See col. 2, ll. 41-51. The use of a plurality of reference and counter electrodes (albeit more complex) would give an operator the flexibility to operate the various working electrodes in a more independent manner providing an operator with greater flexibility. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Liu and provide separate reference and counter electrodes for each working electrode for the sensor of Winkist in order to provide the operator with greater flexibility in operating the working electrodes. With respect to the presence of a common-bias electrode, any of the additional reference or counter electrodes not counted as part of the various series would have read on this additional electrode. With respect to the electrode being for the establishment of a common-bias, there is no claimed structure explicitly drawn to the use of this electrode as being for establishing a common bias. Hence the use of the electrode as a common bias electrode constitutes the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability. With respect to the measurement cell, the beaker of fig. 1 of Winkist would read on the defined measurement cell. With respect to the presence of a pre-amplifier, Winkist (like Glass previously) did not explicitly recite the use of an amplifier as part of the potentiostat. However, Liu also discloses

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the presence of such an amplifier as part of the conventional potentiostat. See fig. 1 and col. 6, ll. 24-37.

10. With respect to the new limitations requiring the electrodes to be mechanically discrete, the various working electrodes of Winqvist are inherently mechanically discrete and the presence of a plurality of reference and counter electrodes (as rendered obvious by Liu) would also be inherently mechanically discrete. With respect to each of the electrodes being in a channel, Winqvist does not explicitly disclose doing this. Teske in an alternate food monitoring sensor teaches feeding the food samples to the sensor via a channel (path from Z to A) past the sensor electrodes. See fig. 2 and col. 4, ll. 25-36. The use of such a channel to help control and distribute fluid to be analyzed by the sensor. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Teske for the sensor of Winqvist and Liu so as to control and distribute fluid to the sensor. If the sensing device of Winqvist were placed in a sample channel as urged above, it would meet this new limitation requiring each electrode to be in a channel.

11. With respect to the electrode materials, see section 3.2 of Winqvist.

12. With respect to the pre amplifier being in the immediate vicinity, again absent an explicit definition of what constitutes an immediate vicinity, the vicinity shown by Liu would meet this limitation. Alternatively, it is well known that the longer one delays amplifying a small measurement signal, the more corrupted the measurement signal can get. Hence one possessing ordinary skill in the art would have been motivated to move the amplifier of Liu to the immediate vicinity of the electrodes to prevent undesirable signal degradation. In addition, see the alternative rejection below.

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13. Claim 21 is rejected in the alternative under 35 U.S.C. 103(a) as being unpatentable over either Glass, Liu and Cummings or Winqvist, Liu and Teske as applied to claim 18 above, and further in view of Toxic Gas CiTiceLs (hereafter "Citicels"). Citicels is a manual for the products of City Technology Ltd that was provided to the examiner on a communication dated 7-30-1999. Hence the reference was published on or before 7-30-1999.

14. If the conventional spacing in the art (and as shown by either Glass or Winqvist in view of Liu) is not construed as reading on the claimed proximate location, Citicels teaches an embodiment that amplifiers can be placed on a circuit board mounted right below a sensor in order to amplify the signal. See fig. 17 (the second of two figures labeled "17") and 18 and p. 29. This configuration would prevent a microamp level signal from being corrupted by long transmittal lengths. In addition, said configuration allows the sensor to have its calibration being programmed in at the source of the sensor. See p. 29. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Citicels for the sensor of either Glass, Liu and Cummings or Winqvist, Liu and Teske in order to prevent the signal from being corrupted and to provide the calibration at the source of the sensor.

15. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over either Glass, Liu and Cummings or Winqvist, Liu and Teske as applied to claim 18 above, and further in view of Goerg et al (USP 3,616,272).

16. The references set forth all the limitations of the claim, but did not specify the presence of any sensor pipes. However, the use of pipes to deliver fluid to an electrochemical sensor is well known in the art. In particular, Goerg shows such a configuration that utilizes pipes to provide sample to a sensor and discharges said fluid allowing continuous measurements. See fig.



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1 and col. 1, ll. 3-21. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Goerg for the sensor of either Glass, Liu and Cummings or Winquist, Liu and Teske in order to allow for continuous measurements. With respect to the claimed arrangement for the pipes (see 112 first paragraph rejection above), the structure of Goerg would be capable allowing fluid to remain around the sensor at all times (for example, by closing valves 4 and 8). Whether or not the references disclosed doing so only constitutes the intended use of the sensor pipes and the intended use need not be given further due consideration in determining patentability.

***Allowable Subject Matter***

17. Claims 19, 22, 23, 25 and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

18. With respect to claim 19, the prior art does not disclose nor render obvious all the limitations of claim 18 and further comprising the specified measurement channels branching out radially of an intake channel with the common-bias electrode in the center of the intake channel. Claims 22, 23, 25 and 26 all depend from claim 19.

***Response to Arguments***

19. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

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***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Thursday from 5:30 A.M. to 3:00 P.M. and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AU 1753  
November 2, 2005

  
**KAJ K. OLSEN**  
**PRIMARY EXAMINER**